

Series	Description
NIMAX-ICB	Induction Hardened and Hard Chrome Plated Steel Bars steel grade: C45E, C35E, 20MnV6, 38MnVS6, 42CrMo4 / Ø6 - 160 mm / Ø1/4" - 6"

### Steel grades correspondents

EN	Werkstoff	DIN	B.S.	UNI	JIS	GOST	AISI SAE ASTM
C45E	1.1191	Ck45	080M46	C45	S45C	45	1045
C35E	1.1181	Ck35	080M36	C35	S35C	35	1035
-	1.5217	20MnV6	55M	-	-	-	A572
38MnVS6	1.1303	38MnSiVS5	-	-	-	-	(10V45) *
42CrMo4	1.7225	42CrMo4	708M40	42CrMo4	SCM440(H)	40ChFA	4140

\* equivalent

### Chemical composition - in % by weight

Steel grade	C	Si	Mn	P	S	Cr	Mo	Ni	V	N
C45E	0.42 ÷ 0.50	max. 0.40	0.50 ÷ 0.80	max. 0.030	max. 0.035	max. 0.40	max. 0.10	max. 0.40	-	-
C35E	0.32 ÷ 0.39	max. 0.40	0.50 ÷ 0.80	max. 0.030	max. 0.035	max. 0.40	max. 0.10	max. 0.40	-	-
20MnV6	0.16 ÷ 0.22	0.10 ÷ 0.50	1.30 ÷ 1.70	max. 0.035	max. 0.035	-	-	-	0.08 ÷ 0.20	-
38MnVS6	0.34 ÷ 0.41	0.15 ÷ 0.80	1.20 ÷ 1.60	max. 0.025	0.020 - 0.060	max. 0.30	max. 0.08	-	0.08 ÷ 0.20	0.010 ÷ 0.020
42CrMo4	0.38 ÷ 0.45	max. 0.40	0.60 ÷ 0.90	max. 0.025	max. 0.035	0.90 ÷ 1.20	0.15 ÷ 0.30	-	-	-

### Mechanical properties

Steel grade	Diameter Ø mm	Tensile strength R <sub>m</sub> N/mm <sup>2</sup>	Yield point R <sub>p0.2</sub> N/mm <sup>2</sup>	Elongation A <sub>5</sub> %	Hardness * Brinell N/mm <sup>2</sup>	Norm
C45E	6 < Ø ≤ 16	min. 710	min. 500	min. 5	218 - 319	EN 10277-5
	16 < Ø ≤ 40	min. 650	min. 410	min. 7	200 - 298	
	18 ≤ Ø ≤ 100	min. 580	min. 305	min. 16	172 - 242	EN 10083-2
	100 < Ø ≤ 160	min. 560	min. 275	min. 16	172 - 242	
C35E	6 < Ø ≤ 16	min. 600	min. 420	min. 6	178 - 298	EN 10277-5
	16 < Ø ≤ 40	min. 580	min. 320	min. 8	172 - 263	
	18 ≤ Ø ≤ 100	min. 520	min. 270	min. 19	154 - 207	EN 10083-2
	100 < Ø ≤ 160	min. 500	min. 245	min. 19	154 - 207	
20MnV6	6 < Ø ≤ 25	min. 700	min. 620	min. 10	213 - 260	Technical data according to internal norm
	19 < Ø ≤ 80	min. 600	min. 460	min. 18	159 - 172	
	80 < Ø ≤ 160	min. 550	min. 420	min. 18	159 - 172	
38MnVS6	20 < Ø ≤ 160	800 - 950	min. 460 **	min. 12	240 - 290	EN 10267
42CrMo4+QT	6 < Ø ≤ 16	1100 - 1300	min. 900	min. 10	298 - 359	EN 10083-3
	16 < Ø ≤ 40	1000 - 1200	min. 750	min. 11	298 - 359	
	40 < Ø ≤ 100	900 - 1100	min. 650	min. 12	271 - 331	
	100 < Ø ≤ 160	800 - 950	min. 550	min. 13	240 - 286	

Note:

Impact energy: min. 27J at -20° C for 20MnV6

Impact energy: min. 35J at 20° C for 42CrMo4+QT

\* The hardness values are for information only

\*\* On request we can provide material with R<sub>p0.2</sub> min. 520 N/mm<sup>2</sup>

## Induction Hardened and Hard Chrome Plated Steel Bars

steel grade: C45E / C35E, 20MnV6 / 38MnVS6, 42CrMo4



Series **NIMAX 120-ICB** - C45E / C35E  
**NIMAX 120-ICBM** - 20MnV6 / 38MnVS6  
**NIMAX 120-ICBV** - 42CrMo4+QT

Dimensions	Ø6 - 160 mm / Ø1/4" - 6"
Diameter tolerance	ISO f7 / other, on request
Roundness	max. 1/2 from diameter tolerance
Standard length	5000 - 7500 mm / on request cut lengths and special lengths
Surface roughness	Ra: max. 0.20 µm
Chrome layer thickness	Ø < 20 mm: min. 15 µm Ø ≥ 20 mm: min. 20 µm
Chrome layer microhardness	min. 900HV0.1
Straightness	Ø ≤ 16 mm: max. 0.3 mm/1000 mm Ø > 16 mm: max. 0.2 mm/1000 mm



- ✓ The hardening is made mainly for conferring a protection of the surface against mechanical strokes or blows (ex. mining equipment constantly stroked by pebbles and dust). The surface does not withstand a high, direct and continuous pressure (like ball bushing), but only hydraulic seals.
- ✓ 20MnV6 steel grade offers better weldability, enhanced mechanical characteristics, impact resistance even at lower temperatures (-20°C).
- ✓ 42CrMo4+QT steel has high hardenability and good toughness, being an excellent material for the oil and gas industry and automotive engineering.
- ✓ 38MnVS6 has excellent machinability, good weldability widely used in civil, mechanical and chemical engineering applications.

### Table of dimensions - tolerance

Diameter mm	ISO f7 µm	Diameter mm	ISO f7 µm
Ø = 6	-10 / -22	30 < Ø ≤ 50	-25 / -50
6 < Ø ≤ 10	-13 / -28	50 < Ø ≤ 80	-30 / -60
10 < Ø ≤ 18	-16 / -34	80 < Ø ≤ 120	-36 / -71
18 < Ø ≤ 30	-20 / -41	120 < Ø ≤ 160	-43 / -83

### Correspondence between steel grade and surface hardness

	NIMAX-ICB C45E	NIMAX-ICBM 20MnV6	NIMAX-ICBM 38MnVS6	NIMAX-ICBV 42CrMo4+QT
Surface hardness beneath the chrome layer	58±3 HRC	45±3 HRC	57±3 HRC	59±3 HRC

The hardening depth is defined as the distance from the surface, beneath the chrome layer up to the point where the hardness value has dropped to the value of the steel core hardness, depending on the steel grade. Generally, the hardening depth is between 0.5 - 4.0 mm, depending on diameter and steel grade.

### Upon request we can provide induction and chrome plated bars with different levels of corrosion resistance

Diameter mm	Standard product	Medium corrosion resistance	High corrosion resistance
	NIMAX 120-ICB NIMAX 120-ICBM NIMAX 120-ICBV	NIMAX 200-ICB NIMAX 200-ICBM NIMAX 200-ICBV	NIMAX 500-ICB NIMAX 500-ICBM NIMAX 500-ICBV
Ø < 20	rating 9 after 72 h in NSS	-	-
Ø ≥ 20	rating 9 after 120 h in NSS	rating 9 after 200 h in NSS	rating 9 after 500 h in NSS

Tested in our own laboratory according to ISO 9227, evaluated according to ISO 10289. On request we can test our products in AASS fog chamber.